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B. insignis var. **shergaonensis** Ahrendt in J. Bot. 79, Suppl. 8 1941; et in J. Linn. Soc. Bot. 57: 37. 1961; Chatterjee in Rec. Bot. Surv. India 16(2) 8. 1953. (Fig.10).

Type: N.E.India: Assam Himalaya, Rages north of Shergaon, in woods, 8000-9000 ft, 1938, *Kingdon-Ward 13617* (holo - BM).

Notes: Under Notes on the Type sheet it is remarked that "An erect shrub 10 ft high, growing in forest where there is a good deal of undergrowth". After examining the Type specimen (*Kingdon-Ward 13617*) of var. *shergaonensis* it is clear that this variety should be kept as a distinct variety under *B. insignis* as the leaves are membranous in var. *shergaonensis* whereas var. *insignis* has coriaceous leaves.

17. Berberis dasyclada Ahrendt in J. Bot. Lond. 79 (Suppl.): 12.1941; et in J.Linn.Soc. Bot.57:36.1961; Chatterjee in Rec. Bot. Surv. India 16(2) 8. 1953. Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 536. 1985; Das Gupta in Sharma et al., Fl. India: 1: 397. 1993. (Fig.11)

B. insignis Hook.f. & Thoms. var. *zelaica* Ahrendt in J.Bot.Lond. 79 (Suppl.) 9. 1941. *Type:* N.E.India, Assam, Himalaya Shergaon, Monyul, 2700-3000m, 28.5.1935 *Kingdon-Ward 11544* (holo - BM).

Type: N.E.India: Assam Himalaya, Poshing La, 3000m, 24.5.1938, *Kingdon-Ward 13700* (holo - BM).

Low growing gregarious shrubs, forming dese thickets, up to 60 cm high; stems terete, pubescent on the upper surface, dark red, usually without spines; internodes 1.5-4 cm long. Leaves 2-4 from each node, 4-12 x 1.2-3.5 cm, narrowly elliptic or lanceolate, coriaceous, acute at apex, attenuate at base, petiolate; petiole 2 mm long; with 10-18, 2-3 mm long serrations along margins, epruinose, lateral nerves depressed on the upper surface, raised on the lower, shining, dark green above. Inflorescence fascicled, 3-8 fld. Flowers golden yellow, fragrant; pedicels 6-12 mm long, slender; bracts 3-5 x 1 mm, lanceolate acuminate. Prophylls 3, 3.5-5 mm long, deltoid or lanceolate, acuminate. Outer sepals 3, 5 x 3 mm elliptic, concave, obtuse; inner sepals 4, 7-8 x 5-6 mm, obovate, obtuse, entire. Petals 6, 4.5 - 5 x 4 mm, obovate, clawed at base, emarginate at apex; nectary glands 1 mm long, lanceolate. Stamens 4 mm long; filaments 2.5 mm long; anthers 1 mm long, apiculate. Ovary oblong, ca 4 x 1.5 mm, estylose; ovules 3-4. Berries epruinose.

Fl.: May-June.

Distribution: INDIA: Arunachal Pradesh (Endemic).

Ecology: In pine and rhododendron forest; 2700-3600 m.

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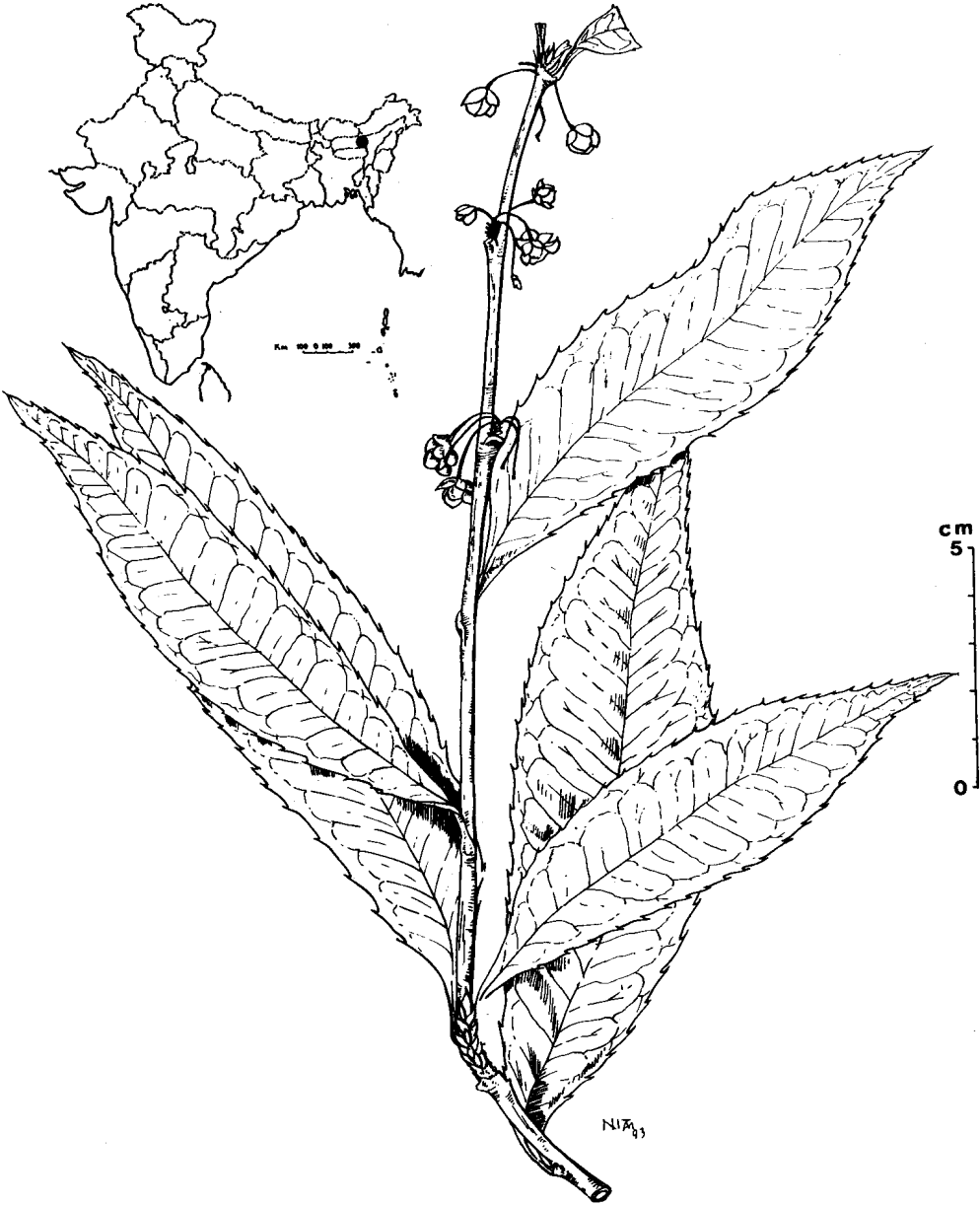


Fig. 10. *Berberis insignis* Hook. f. & Thoms. var. *shergaonensis* Ahrendt (Based on *Kingdon-Ward 13617*)

Revision of Berberidaceae of India

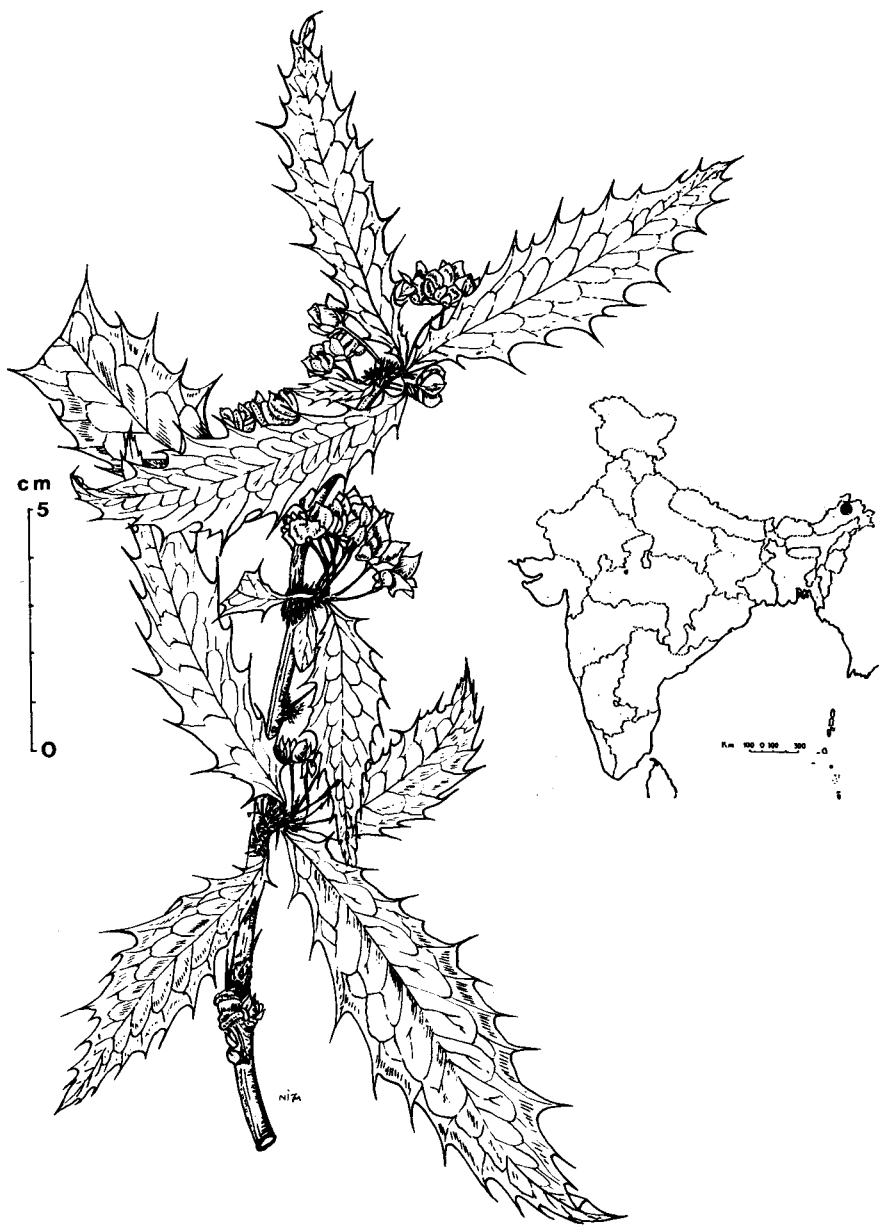


Fig. 11. *Berberis dasyclada* Ahrendt (Based on *Kingdon-Ward 13700*)

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Specimens examined: Arunachal Pradesh: Hotspring, K. Haridasan s.n. (LWG); Kameng, Senge Dzang, 21.5.1957, R.S.Rao 7650 (CAL).

Notes: Details of this species have been sent to the Red Data Book for inclusion.

18. *Berberis incrassata* Ahrendt in Gard. Chron. 3, 105:371. 1939; et in J.Bot. Lond. (Suppl.) 79: 10. 1941; et in J.Linn. Soc. Bot. 57: 38. 1961; Mulligam in Gard. Chron. 3, 108: 41. f. 19. 1940; Schneid. in Mitt. Dtsch. Dendr. Ges. 55: 45. t. 6. 1942. (Fig. 12).

B. insignis Hook.f. & Thoms. subsp. *incrassata* (Ahrendt) Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 537. 1985.

Type: Upper Burma : Adung valley, 2100m, *Kingdon-Ward 9358* (holo - BM).

Small shrubs up to 2-2.5 m; stem dark red, glabrous; internodes 3-5 cm long; spines almost absent or 3-fid. Leaves 5-15 x 1-3 cm, lanceolate to elliptic lanceolate, rigidly coriaceous, epruinose below, pruinose white above, apex mucronate or ending in a spine, base attenuate; margins with 12-14 spinose serrations; spines 1.5-3 mm long, 5-8 mm apart; dull grey-green above; slightly lustrous paler yellow-green below; lateral nerves raised on both surfaces. Inflorescence fascicled, 15-30 flowered; pedicles 10-15 mm long, slender at base, thickened to 1.5 mm at apex. Flowers bright yellow; outer sepals 4 x 3.5 - 3.75 mm, ovate, acute; median sepals 5.5-6 x 4-5 mm, ovate-elliptic, obtuse; inner sepals 7.5 -8 x 5-6 mm, obovate, obtuse; Petals 6 x 4 mm, obovate, entire, base cuneate; glands oval-shaped 0.8-1.25 mm long. Stamens truncate, produced; anthers 1 mm long; filaments 2 mm long. Ovules 5-7. Berries black epruinose.

Fl.: April-May

Distribution: INDIA: Sikkim; Arunachal Pradesh; NE UPPER BURMA; CHINA.

Ecology: In thickets, under bamboos and on cliffs; 1200-2300 m.

Specimens examined: Sikkim: On way to Ralang, 9.1.1983, *D. Banerjee 2533* (BSHC, LWG). Arunachal Pradesh: W. Kameng. Dt., 3 Km away from Bomdila on way to Dirang, 2300 m, 4.5.1993, *T.S.Rana & B.Datt 210334* (LWG).

Notes: Ahrendt (1961) had separated *Berberis incrassata* from *B. insignis* based on, a) entire petals, b) 5-7 ovules, c) globose fruits and d) leaves without hypoderm, are sufficient to segregate *B. incrassata* from *B. insignis* and these characters appear to be static and sufficient. The statement of Chamberlain and Hu (1985) "that the differences between the two subsp. are too slight to maintain them as separate species" is not tenable. One important field identification character between these two species is that the lateral

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Fig. 12. *Berberis incrassata* Ahrendt (Based on Kingdon-Ward 9358)

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nerves are very prominent in *B. incrassata*, whereas they are not so prominent in *B. insignis*.

Remarkable variations with regard to nature of spines can be observed in the species from almost spineless (as in Type) to sturdy 3-fid spines in one specimen (*T.S.Rana & B.Datt 210334*). The lower leaves are much larger and whitish beneath, a character clearly observed in the field.

A note on the type specimens (*Kingdon-Ward 9358*) written by the collector himself clearly mentions This species to be close to *Berberis insignis* and *B. hypokerina* but the above two species have much smaller flowers and leaves are different from *B. incrassata*.

Berberis incrassata has been reported for the first time from Sikkim and Arunachal Pradesh.

19. *Berberis sanei* Husain et al. in Adansonia 17 (1-2): 69-73. f. 1. 1995.

Type: India, Arunachal Pradesh, Bomdila, Palit Hills, ca 3300m, 5 May 1970, *Mehrotra & Party 2439* (holo - LWG; iso - CDRI).

Erect shrubs ?; stems yellow or yellow brown, often with warty hairs; spines 3-fid, 1.7-2.3 cm long, stout. Leaves 8-12.5 x 2.5-4.2 cm, elliptic to obovate-elliptic, apex ending into a spine, base tapering, distinctly white pruinose above, dull, shining below, margins 13-18 spinose; spines 1-1.5 mm long, up to 6 mm distant; petioles 2-3 mm long. Inflorescence fascicled, upto 13-fld., Flowers yellow; pedicels 13-15 mm long. Outer sepals 4-5 x 3-3.5 mm, obovate, obtuse, entire; gland on petals 1.5-1.75 mm long, lanceolate. Anthers 1 mm long; connective apiculate; filaments 2 mm long. Ovary shortly stylose; ovules 4-5. Berries not seen.

Fl. & Fr.: April - Sept.

Distribution: INDIA: Arunachal Pradesh (Endemic).

20. *Berberis hookeri* Lemaire, Illus. Hort. 6: 207. 1859; Chatterjee in Rec. Bot. Surv. India 16(2) 8. 1953. Ahrendt in J.Linn. Soc. Bot. 57:39. 1961; Grierson & Long, Fl. Bhutan 1 (2): 326. 1984; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3): 533. 1985; Das Gupta in Sharma et al., Fl. India 1: 395, f. 59. 1993.

B. wallichiana sensu Hooker, Bot. mag. 77: t. 4656. 1852, non DC. 1824.

B. hookeri Lemaire var. *viridis* Schneid. in Bull. Herb. Boiss. ser. 2, 8: 197. 1908. Type: N. India, Sikkim, Lachen valley, May. 1849, *Hooker s.n.* (K).

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B. hookeri Lemaire var. *microcarpa* Ahrendt in J.Linn.Soc.Bot. 57:40.1961. Type: N.India, Sikkim, Oct., 1874, *Clarke 25561* (K).

B. hookeri Lemaire var. *platyphylla* Ahrendt in J.Linn.Soc. Bot. 57:40.1961. Type: N.India, Sikkim, *Hooker 40* (K).

Type: ?

Erect shrubs, ca 1 m high; stems terete, angled, gland-dotted, mature yellow; internodes 2-6 cm long; spines 3-fid, upto 2.5 cm long. Leaves 3-6 x 1-2 cm, elliptic, oblong or broadly elliptic-lanceolate, acute or obtuse at apex, attenuate at base to a short petiole, 5-19 spinose-dentate along margins, lustrous dark green above, white-pruinose beneath; veins prominently reticulate. Inflorescence fascicled, 3-8 fld.; pedicels 1.5-2 cm long. Prophylls 2.5-3.5 x 1.5-2 mm, ovate, concave, acute, thickened at middle. Outer sepals 3x1.5 mm, ovate; innermost sepals 8 x 4.5 mm, elliptic. Petals 5-6 x 3.5 - 4.5 mm, obovate, obtuse at apex. Stamens 3-4 mm long; filaments ca 2.2 mm long; anther 1.2-1.7 mm across. Ovules 6-8; stigma 1.2-2 mm broad. Berries 2-2.5 x 0.4-0.7 cm, oblong, purplish black, estylose.

Fl. & Fr.: March - Oct.

Distribution: INDIA: West Bengal, Sikkim, Arunachal Pradesh, Nagaland, Manipur; NEPAL, BHUTAN; CHINA.

Ecology: 2250-3000 m.

Specimens examined: West Bengal: Darjeeling, 2700m, 13.3.1919, *G.H.Cave s.n.* (CAL), Darjeeling Botanic garden, J.H.Naskar s.n. (CAL); Darjeeling, East of Phallna, 3000 m, 21.10.1904, *I.H.Burkill 25321* (CAL). Sikkim: 3000 m, May, 1885, *G. King s.n.* (CAL) *S.K.Mukerjee 2758* (CAL). Manipur: Sirohi, 2250 m, 20.4.1948, *s.l. s.n.* (CAL).

Notes: According to Chamberlain & Hu (1985) *Berberis hookeri* is a variable species, especially in leaf shape, size and colour, thus there is no justification for maintaining the varieties distinguished by Ahrendt on the size of the fruit and density of the teeth on the leaf margins.

21. *Berberis micropetala* Schneid. in Fedde Repert. Spec.Nov. 46:266.1939; Ahrendt in J. Linn. Soc. Bot. 57: 67.1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3):549. 1985; Guha Bakshi in Sharma et al., Fl. India 1:393. 1993.

Type: NE India, Naya Hills, Saramati Ridge, 2800 m, *Bor 2921* (holo - K).

Shoots sulcate; internodes 2.5-3.5 cm long; spines 1-2 cm long, sulcate. Leaves

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2.5-4.5 x 0.9-1.8 cm, oblong-elliptic, acute, 1-4 spinulose-toothed on either side, openly veined greyish, pruinose below. Inflorescence fascicled, 4-5-fld.; pedicels 3-4 mm long. Sepals in 3-series; outer sepals 4.5-3 mm, ovate acuminate; median sepals 7-8 x 5 mm, oblong-obovate; inner ones 8-9 x 5 mm. Petals 4 x 2.5 mm, white, emarginate. Stamens apiculate. Ovules 2, sessile. Berries estylose.

Fl. & Fr.: March-June

Distribution: INDIA: Nagaland (Endemic).

Ecology: Open grassy ridge; 3000 m.

22. *Berberis wallichiana* DC., Prodr. 1: 107. 1824; Wall., Pl. As.Rar. 3: 23. t. 243. 1832; Chatterjee in Rec.Bot. Surv. India 16(2): 10. 1953; Ahrendt in J. Linn. Soc. Bot. 57:71. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 549. 1985; Guha Bakshi in Sharma et al., Fl. India 1:395, f. 58.1993.

Type: Nepal, Mt. Sheopur, *Wallich 1478* (iso - BM, K).

Shrubs 2-3 m tall; stems subangled, glabrous; internodes 3-4 cm long; spines 1.5 - 2 cm long, slender. Leaves 4-8 x 0.9-2.5 cm, oblong-lanceolate or lanceolate, apex mucronate or acute to subacute, base attenuate, subsessile, epapillose, margins 12-25 spinose, sublustrous above, thickly coriaceous. Inflorescence fascicled, 10-20-fld; pedicels 6-10 mm long, stout. Outer sepals 3 x 1.5 mm, oblong-obovate; inner sepals 4.5 - 5 x 3 mm. Petals 4.75 - 5.25 x 2.5 mm, obovate, entire; glands on petals separate lanceolate. Ovules solitary, shortly stipitate. Stamens 3.5 - 4 mm. Berries 8-9 x 4-5 mm, excluding style 0.5-0.75 mm, ovoid, black, epruinose.

Fl. & Fr.: April-Oct.

Distribution: INDIA: Arunachal Pradesh, Manipur; Meghalaya; NEPAL; BHUTAN.

Ecology: On ridges, in rhododendron and oak scrub; 1410-3300m.

Specimens examined: Arunachal Pradesh: Subansir F.D., 30/9/1959 *G. Panigrahi 19815* (CAL); Kameng, 16/5/1958, *G. Panigrahi 15709* (CAL); NEFA, *R. Seshagiri Rao 1565* (CAL); Subansiri Dist, Ziro to Tamen, 14/6/1961, *G.V. Subba Rao 25009* (CAL); Kameng, Senge Dirong, *R.S. Rao 7653* (ASSAM); Senge Dirong, Kingdon-Ward 19282 (ASSAM); Parila *R.S.Rao 16095* (ASSAM); Subansiri, Zoram village, *Panigrahi 19815 C* (ASSAM); Tamen, Subba Rao 29009 (ASSAM). Meghalaya: Shillong peak, near Governor House, 6.4.1969, *B.P. Uniyal s.n.* (BSD); Lyndoh forest, Maphlong, 1800 m, 22.10.1914, *U.N. Kanjilal 4661* (DD); Shillong, 1800 m,

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30.3.1895, *King's Coll. s.n.* (DD); K. & J. Hills, 1410 m, *G. Panigrahi 4539* (CAL); K. & J. Hills, Peak forest, *P.C. Kanjilal 10041* (ASSAM); Elephant falls, *H. Deka 23046* (ASSAM); Shillong, *U. Kanjilal 7954* (ASSAM); Shillong peak, *G.K. Deka 21396* (ASSAM); Lake garden, *P.C. Kanjilal 9009* (ASSAM); Nongpoh, *P.C. Kanjilal 8908* (ASSAM); Dumpep, *R.N. De -19841* (ASSAM), Maphlong, *V. Kanjilal 2494* (ASSAM).

Notes: Ahrendt (1961) had mentioned *Wallich 1819* (K) as the Type of *Berberis wallichiana* but later on Chamberlain & Hu (1985) have cited *Wallich 1478* (K) as the isocrassata of this species. Another specimen, *Wallich 1478* from BM showed very thick rigid leaves, with a lustrous nature on the upper surface. This could also be another isotype of the species.

23. *Berberis victoriana* Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 554. 1985.

B. wallichiana DC. var. *gracilipes* Ahrendt in J. Bot. 79 (Suppl.): 17. 1941.

Type: India: Manipur Sirohifuros, *Watt 6449* (holo - K; iso - E).

Shrubs 2 mm tall; branches glabrous, distinctly sulcate; internodes 3.5-6 cm long; spines 1-2.5 cm long, 3-fid. Leaves 2.5-3.5 x 1.2-2.4 cm, elliptic or oblong-elliptic, acute or mucronate, petiolate; petiole 1 mm long; margins with 5-8 spinules. Inflorescence fascicled, 8-18-fld; pedicel 1.4-2.4 cm long, glabrous; bracteoles 2 x 1.5 mm, ovate-lanceolate. Outer sepals 3.5 - 4 x 2.5 - 3 mm, ovate-lanceolate; inner sepals 5.5-6.5 x 3-3.5 mm, apex rounded; petals 5 x 3.5 mm, obovate. Stamens 4 mm long, apex truncate. Ovule 1. Berries not known.

Distribution: INDIA: Manipur; NW UPPER BURMA.

Ecology: Forest margins; 2100-2700 m.

Notes: We have included *Berberis victoriana* in our account on the authority of Chamberlain and Hu (1985) who have described it as a new species, treating under it *B. wallichiana* var. *gracilipes* Ahrendt as a synonym, both having different Types. This is somehow not understandable to us. *B. wallichiana* var. *gracilipes* is a validly published name and we do not find any reason for its treatment as a synonym of a new species.

24. *Berberis sublevis* W.W. Smith in Notes RBG Edinb. 9.83.1916; Ahrendt in J. Linn. Soc. Bot. 57:58. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3): 555. 1985; Guha Bakshi in Sharma et al., Fl. India 1:404. 1993.

B. sublevis W.W. Smith var. *grandiflora* Schneid. in Repert. Spec. Nov. Regni Veg. 46:253. 1939. *Type:* China, SW Yunnan, around Tengchong, *Rock 7930* (holo - A, n.v.).

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B. sublevis W.W.Smith var. *gracilipes* Ahrendt in J.Bot. 79:17. 1941. Type: NE India, Meghalaya, Khasia Hills, Motling, *Simms 114* (holo - K).

B. sublevis W.W.Smith var. *exquisita* Ahrendt in J.Linn.Soc. Bot. 57:58 1961.Type: China, NW of Tengyueh (Tengchang), ii. 1925, *Forrester 26196* (holo - K., iso - E).

B. wallichiana DC. var. *microcarpa* Hook.f. & Thoms.,Fl. Ind. 1: 226. 1855. Type: NE India, Meghalaya, Khasia, 5000-6000 ft, *Hooker & Thomson* (iso - E).

B. sublevis W.W.Smith var. *microcarpa* (Hook.f.&Thoms.) Ahrendt in J. Linn. Soc. Bot. 57:58. 1961.

Type: China, SW Yunnan, around Tengyueh (Tengchong), *Forrest 9559* (holo - E; iso - K).

Erect shrubs 1-2 m tall, stems more or less verruculose; spines 1.5 cm long; internodes 2-4 cm long. Leaves 2.5-8 x 0.5-4 cm, lanceolate, acuminate, subcoriaceous, with 10-18 subappressed spinules along margins, petiole 1-4 mm long; enervate or slightly veined. Inflorescence fascicled, 15-30- fld.; pedicels 7-15 mm long, slender. Prophylls 1.5 x 1 mm, ovate acute, red; outer sepals 2.5-2.75 x 2 mm, ovate, subacute, raddish; inner sepals 5 x 3 mm, obovate to oblong-elliptic. Petals 5-5.5 x 3 mm, clawed; glands 1.5 x 0.5 mm. Stamens 3-3.5 mm long, obtuse; anthers 1.25-1.5 mm long; filaments 1.5-1.75 mm long. Berries 6-7 x 3-3.5 mm, black, estylose.

Fl. & Fr.: April - Nov.

Distribution: INDIA: Manipur, Meghalaya; N.UPPER BURMA; W.CHINA (SW Yunnan).

Specimens examined: Manipur: Sirwhifurar, 2100-2400 m, April, 1882, *G. Watt 6449* (MH, CAL); Sirwhifurar, 2100-2400 m, April, 1882, *G. Watt 6428* (CAL). Meghalaya: Shillong peak, 6/3/1990, *D.M.Verma 38402* (CAL).

Notes: According to Chamberlain and Hu (1985) "this species is unique in sect. *Wallichiana* in its long funicle".

25. *Berberis manipurana* Ahrendt in Kew Bull. 1939:262. 1939; et in J. Linn.Soc.Bot. 57:47. 1961; Chatterjee in Rec.Bot.Surv. India 16 (2): 10. 1953; Chamberlain & Hu in Notes Roy.Bot.Gard. Edinb. 42 (3): 549. 1985; Das Gupta in Sharma et al., Fl. India 1: 401, f. 62. 1993.

Type: India: Manipur, Ching Sow, NE ranges, 2400 m, Watt 6533 (holo - K; iso - E).

Shrubs 2-3 m tall; stems angled, glabrous, lower branches terete; internodes 2-6 cm long; spines 2-6 from a node, 5-30 mm long, concolorous, sulcate, middle ones longer. Leaves

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5-8.5 x 1-3 cm, oblong to ovate-elliptic, acute - mucronate at apex, attenuate at base forming a 2-4 mm long petiole, margins 10-20 spinose, lustrous above, epruinose. Inflorescence fascicled, 6-15- fld.; pedicels 12-20 mm long, slender. Prophylls 3 x 1.5 mm, lanceolate, red. Outer sepals 5 x 3 mm, ovate or oblong-ovate, acute or subacute; median sepals 8 x 6 mm; inner sepals 10 x 8 mm, obovate. Petals 5-8.5 x 2.5-7.5 mm, obovate, emarginate, glandular. Stamens 3-5.5 mm long; anthers 1.5 mm long, connective 2-dentate. Ovules 2-5. Berries 7-10.5 x 5-6 mm, oblong, pruinose blue.

Fl. & Fr.: March - Oct.

Distribution: INDIA: Manipur, Meghalaya.

Specimens examined: Meghalaya: Shillong, Khasia Hills, 1800 m, June, 1890, *H. Collett s.n.* (CAL); 24.11.1956, *G.Panigrahi 4539* (CAL).

- 26. *Berberis wardii*** Schneid. in Fedde, Report. Spec. Nov.46:262. 1959; Ahrendt in J. Linn. Soc. Bot. 57: 49. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3): 549. 1985; Das Gupta in Sharma et al., Fl. India 1:403. 1993.

Type: N.E. India, Japvo, Naga Hills. 2.12.1927, *Kingdon-Ward 7729* (holo - K).

Bushy shrubs; stems angled; shoots purple, finally yellow; internodes 1-1.5 cm long; spines 1 cm long. Leaves 6-8 from each node, 2-3 x 1-1.5 cm, elliptic to ovate-elliptic, 5-9 spinulose along margins, deep greyish green, pruinose or waxy white beneath; lateral and marginal veins and a few veinlets elevated. Inflorescence fascicled, 2-5 fld.; pedicels 1.5-2.5 cm long, red. Prophylls small; outer sepals 4x3 mm, ovate, obtuse; inner sepals 7-8 x 4-5 mm, oblong-elliptic to oblong-ovate, subentire. Petals ca 8 cm long, obovate oblong, emarginate; glands oblong; stamens slightly produced; apex crenulate with shortly apiculate centre. Ovary ellipsoid; stigma sessile; ovules sessile. Berries shortly stylose, blue black.

Fl. & Fr.: Aug.-Dec.

Distribution: INDIA: Nagaland (Endemic).

Ecology: Open grassy places, amongst *Ilex* and *Rubus*, 3000-3200 m.

Notes: Details of the species have been sent to the *Red Data Book* for inclusion as a rare species.

- 27. *Berberis praecipua*** Schneid. in Fedde Rep. Sp. Nov. Regni Veg. 46: 248. 1939; Mitt., Dtsch. Dendr. Ges. 55: 14. 1942; Chatterjee in Rec. Bot. Surv. India 16 (2): 11. 1953; Ahrendt in J. Linn. Soc. Bot. 57: 42. 1961; Chamberlain & Hu in Notes Roy. Bot.

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Gard. Edinb. 42 (3): 548. 1985; Banerjee in Sharma *et al.*, Fl. India 1: 404 1993. (Fig. 13).

B. subteroclada Ahrendt var. *minoripes* Ahrendt in J. Linn. Soc. Bot. 57. 73. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3): 548. 1985. Type: Bhutan: Ha Dzong, 2700 m, Ludlow, Sherriff & Hicks 16015 (holo - BM; iso - E).

B. poluninii Ahrendt in J. Linn. Soc. Bot. 57. 73. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 548. 1985. Type: C. Nepal: Compaling; 3 miles E. of Timure, 3200 m, Polunin 746 (holo - BM)

Type: Bhutan; 13 Aug., 1914, Phajudin Jimpu, Cooper 2524 (E).

Shrubs 1-1.5 m tall; stems sulcate, yellow; internodes 1.5-3.5 cm long; spines 3-fid, 7-25 mm long, sulcate. Leaves 2-6 x 0.5-1.2 cm, narrowly oblong-elliptic, to elliptic-lanceolate, apex mucronate with a spine on top, base attenuate, 3-15 spinose-serrate, slightly lustrous, thick, rigid, dull above, pruinose below, with a few veins elevated on both surfaces. Inflorescence fascicled, 3-10-fld; pedicel 5-10 mm long, slender, sulcate. Outer sepals 2.5-1.5 mm long, ovate subacute; inner sepals 4.5-3.25 mm long, obovate. Petals 3.5 x 2 mm, obovate, entire. Stamens truncate. Ovules solitary. Berries 6 x 3 mm, pruinose blue, style 0.5 mm long.

Fl. & Fr.: April - Oct.

Distribution: INDIA: Arunachal Pradesh, Meghalaya, Assam; NEPAL, BHUTAN.

Specimens examined: Meghalaya: Shillong peak, 1900 m, 24.4.1993, T.S. Rana, B. Datt & Brij Lal 210301 (LWG). Assam: J. & K. hills, holy forest, 19.5.1958, B.K. Nayar & Party 50625 (LWG).

Notes: Ahrendt (1961) had kept *B. praecipua* under section *Wallichianae*, subsect. *Replicatae* in which stems are terete or subterete, yellow and fruits pruinose, whereas Chamberlain and Hu (1985) have merged *B. poluninii* Ahrendt and *B. subteroclada* var. *minoripes* Ahrendt of the subsect. *Leavis* under section *Wallichiana* which have according to Ahrendt (l.c.) characters such as sulcate stems and pruinose blue berries. Another important character by which subsections *Replicatae* and *Leavis* are separated by Ahrendt (l.c.) is based on leaves which are very revolute in subsection *Replicatae* but not or scarcely so in subsection *Leavis*. Chamberlain and Hu (1985) have segregated *B. praecipua* from *B. griffithiana* on the basis of the following characters: 1) Flowers 3-7 per fascicle; 2) pedicels 20-23 mm long; 3) Ovules 2-4 and 4) leaves dull green above in *B. griffithiana* whereas in *B. praecipua* 1) Flowers 5-15 per fascicle; 2) Pedicels 7-17 mm long; 3) ovules 1-2 and 4) leaves slightly lustrous. We follow Chamberlain and Hu (1985) in keeping *B. poluninii* and *B. subteroclada* var. *minoripes* under *B. praecipua* though there are a lots of differences between these

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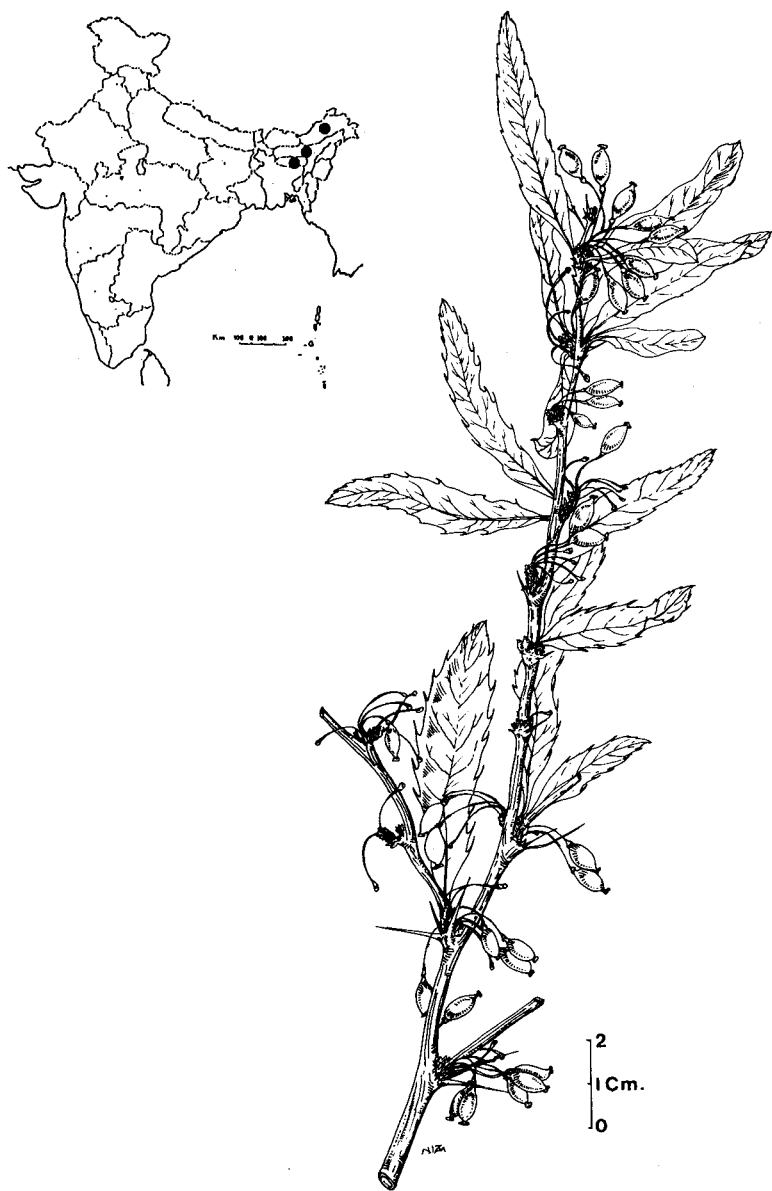


Fig. 13. *Berberis praecipua* Schneid. (Based on: T.S. Rana & Party 210301).

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species as already discussed above. But without looking at the Types we cannot derive at any definite conclusion.

- 28. *Berberis griffithiana*** Scheid. in Bull. Herb. Boiss. ser. 2, 5: 403.1905; Chatterjee in Rec. Bot. Surv. India 16(2): 9. 1953; Ahrendt in J. Linn. Soc. Bot. 57: 43.1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42(3): 547. 1985; Banerjee in Sharma *et al.*, Fl. India 1: 403. 1993. (Fig. 14).

B. subteroclada Ahrendt in J. Bot. 79 (Suppl.): 21. 1941. Type: Bhutan, Chendebi, 2800 m, 14.5.1937, Ludlow & Sherriff 3046 (holo - BM).

B. subteroclada Ahrendt. var. *impar* Ahrendt in J. Bot. 79, (Suppl.): 21. 1941. Type: Bhutan, Chendebi, 2800 m, 14.5.1937, Ludlow & Sherriff 3045 (Holo - BM).

Evergreen shrubs 1-3 m tall; stems verruculose, yellow, sulcate; spines 3-fid, 1-2.5 cm long. Leaves 1.5-6 x 0.3-1.3 cm, lanceolate, oblong-elliptic or elliptic-lanceolate, apex acute or mucronate, decurrent, sessile, margins with 3-10 appressed spinules, lateral veins clearly visible, dull grey-green below. Inflorescence fascicled, 4-20-fld; pedicels 16-25 mm long, slender. Prophylls 1.5- 2 x 1-1.5 mm. Outer sepals 4-5 x 3-4 mm, ovate to obovate, apices rounded; inner sepals 6.5-9 x 4-6 mm, elliptic or obovate. Petals 5.25- 7.5 x 3.5 - 4 mm, obovate, emarginate; glands 1.5-2 mm long, lanceolate, acuminate. Anthers 1 mm long; filaments 2.5 mm long; apices of stamens truncate with a long connective. Berries 8-10 x 3-4 mm, reddish, epruinose, estylose.

Key to the varieties (after Chamberlain & Hu, 1985)

1. Leaves green, epruinose below ***B. griffithiana* var. *griffithiana***
1. Leaves glaucous, (pruinose below) ***B. griffithiana* var. *pallida***

B. griffithiana* var. *griffithiana

Type: Bhutan, Griffith 125 (syn. - W); Bhutan, Griffith 1742 (syn. - E, K, CAL).

Fl.: April-May

Distribution: INDIA: Arunachal Pradesh, Meghalaya; BHUTAN; CHINA (S.E. Tibet)

Ecology: In Tsuga, Rhododendron and bamboo forest, 2500-3300 m.

Specimens examined: Arunachal Pradesh: Lower Subansiri Distt.: Ziro, 1650 m, 1.5.1993, T.S.Rana & Party 210330 (LWG); 1 Km from Hapoli, 1650m, 1.5.1993, T.S.Rana & Party 210325 (LWG); 1 Km from Hapoli, 1650 m, 1.5.1993, T.S.Rana & Party

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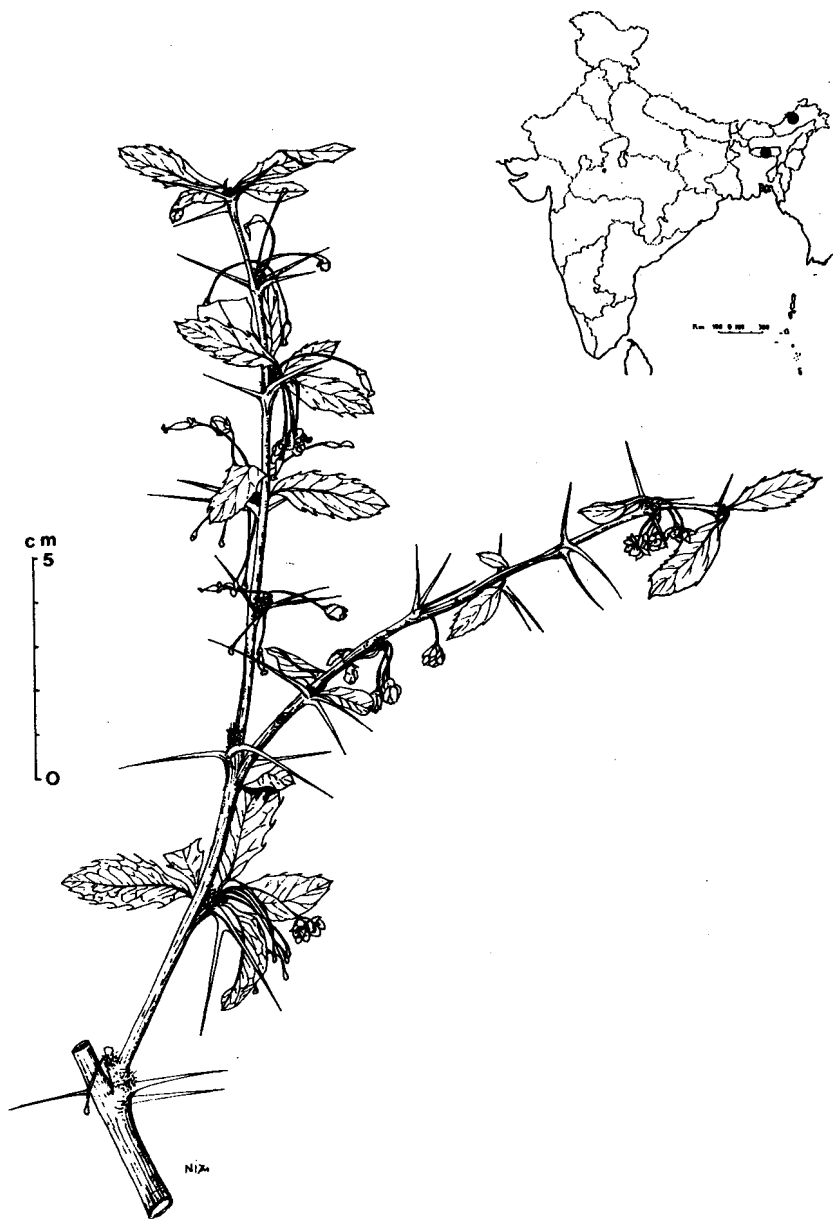


Fig. 14. *Berberis griffithiana* Schneid. (Based on T.S. Rana & Party 210330)

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29. *Berberis replicata* W.W.Smith in Notes Roy. Bot. Bot. Gard. Edinb. 11: 200. 1920; Stapf in Bot. Mag. 151:t. 9076. 1925; Ahrendt in J. Linn. Soc. Bot. 57: 43. 1961; Chamberlain & Hu in Notes Roy. Bot. Gard. Edinb. 42 (3): 547. 1985.

Type: China, Yunnan, N of Tengyueh (Tengchong), *Forest 7785* (holo - E; iso - K).

Shrubs 1-1.5 m tall; stems glabrous, terete, distinctly verruculose; spines 1-2.6 cm long, 3-fid. Leaves 2-3.5 x 0.3-0.9 cm, elliptic, oblong-elliptic to oblong lanceolate, apex ending into a spine, base attenuate, coriaceous, dull green above, pruinose white below, margins entire or with 1-3 spinose serrate, margins revolute. Inflorescence fascicled, 2-12-fld, bracts 1.5 mm long. Outer sepals 4-5x3 mm, acute or subacute; inner sepals 5.5-6x3.5 mm obovate. Petals 5-6 x 3.75-4 mm, obovate, acutely emarginate; glands 0.5-2 mm long. Stamens 4-4.5 mm long, truncate. Ovules 2, sessile. Berries 6-8 x 3-5 mm, oblong; style 0.25 mm long.

Notes: *Berberis replicata* var. *replicata* is reported from China (SW Yunnan) and hence not included in this account, the other variety, var. *dispar* though previously reported from Tibet and Bhutan has extended its Distribution to Arunachal Pradesh in NE India. This is evident from our own collections.

Berberis replicata* var. *dispar Ahrendt in J. Bot. 79 (Suppl.) 20. 1941; Chatterjee in Rec. Bot. Surv. India 16(2): 11. 1953.

Type: S. Tibet: between Pangchen and Le, Nyam Jang Che, 7500 ft, 4.4.1936, *Ludlow & Sherriff 1274* (holo - BM).

Inflorescence 2-6-fld; outer sepals 4-5 mm long, acute; glands on petals 1.5-2 mm long.

Fl. & Fr.: April - July.

Distribution: INDIA: Arunachal Pradesh; TIBET; BHUTAN.

Ecology: Open scrub jungle; 2250-2500 m.

Specimens examined: Arunachal Pradesh: Bomdila on way to Dirang, 4.5.1993, *T.S.Rana & Party 210335* (LWG).

Notes: The identity of *Berberis replicata* var. *dispar* has been discussed by Husain *et al.* (1994). They have concluded that *B. replicata* var. *dispar* is closer to var. *replicata* than it is to *B. griffithiana*, thus contradicting Chamberlain and Hu (1985) who had placed *B. replicata* var. *dispar* under *B. griffithiana* var. *pallida*.

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30. **Berberis asiatica** Roxb. ex DC., Syst. Nat. 2:13. 1821, non Griffith, 1847; Hook.f. & Thoms. in Hook.f., Fl. Brit. Ind. 1:110. 1872; Duthie, Fl. Upper Gang. Pl. 1:32. 1903; Haines, Bot. Bihar & Orissa 1:20. 1921; Chatterjee in Rec. Bot. Surv. India 16(2): 13. 1953; Ahrendt in J.Linn. Soc. Bot. 57:86. 1961; Uniyal & Rao in Sharma *et al.*, Fl. India 1:370. 1993. (Fig.15).

Vern.: Kilmora (Kumaon)

Shrubs up to 3 m tall; stems yellowish, young ones sulcate, and puberulous, mature stems terete, glabrous; internodes upto 4 cm long; spines 3-fid, 0.9-3 cm long, central spine longer than the lateral ones. Leaves 1.1-7.5 x 0.8-3.5 cm, obovate, oblong-obovate or elliptic, apex mucronate, base attenuate, shortly petiolate; petiole 1-5 mm long, thickly coriaceous, entire or distinctly 2-6-spinose along margins, upper surface distinctly reticulate, lower surface papillose but reticulations less distinct. Inflorescence fascicled, racemose or umbellete-racemose, 15-25-fld; pedicels 0.5-2.5 cm long, glabrous, reddish; bracts 2.5-3 x 2-2.5 mm. Outer sepals 2-4 x 2-3 mm, broadly ovate; inner sepals 6-8 x 4-5 mm obovate. Petals 7-8 x 5.5-6 mm, obovate, emarginate; glands obovate. Stamens 3.5-5 mm long, truncate; anthers 2-3 mm long; filaments 1.5-2 mm long. Ovary ellipsoid; ovules 2-5. Berries 8-10 x 7 mm, oblong-ovoid to ellipsoid, pruinose, young ones green or pinkish green mature ones pinkish, turning reddish and finally dark purple or black, stylose; style 0.5-1.5 mm long.

Notes: Ahrendt (1961) recognised two varieties, viz. *B. asiatica* var. *asiatica* and var. *clarkeana* but the characters on which he had segregated these two varieties could be observed in both the varieties, even in one and the same specimen one can see both entire as well as spinose leaves and umbellate-racemose as well as fascicled inflorescences. Although these two varieties are geographically isolated and distinct, at least morphologically these varieties do not deserve the segregation. The authors could not examine the Type specimen of var. *clarkeana* (Clarke 3417 - B, K) and therefore no definite conclusion could be drawn. Therefore, Ahrendt's (1961) treatment is followed.

Key to the varieties (after Uniyal & Rao, 1993)

1. Leaves usually with 2-5-spinulose margins; flowers in umbellate-racemes **B. asiatica** var. **asiatica**
1. Leaves usually with entire margins; flowers in fascicles **B. asiatica** var. **clarkeana**

Berberis asiatica var. **asiatica**

Type: Nepal: 1819, Wallich 1477 (Holo - K).

• *Fl. & Fr.* March-May.

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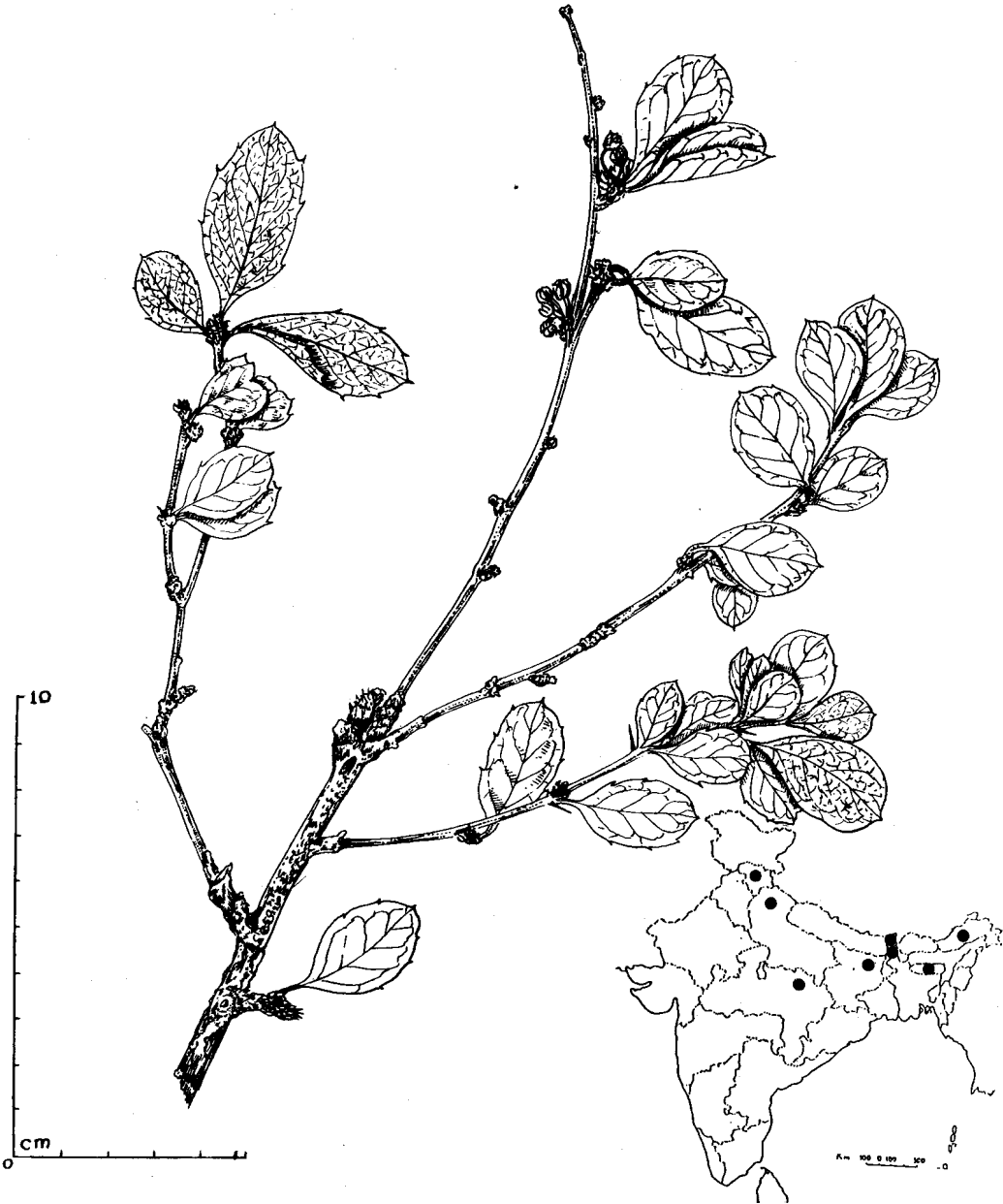


Fig. 15. *Berberis asiatica* Roxb. ex DC. var. *asiatica* (Based on J.N. Vohra 11199)

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Distribution: INDIA: Himachal Pradesh, Uttar Pradesh, West Bengal, Sikkim, Arunachal Pradesh, Meghalaya, Bihar, Madhya Pradesh; AFGHANISTAN; NEPAL; BHUTAN; CHINA.

Ecology: Sub-Himalayan ranges, hillsides and valleys, sometimes associated with *Querus* and *Rhododendron*; 900-2500 m.

Chromosome No.: n = 14 (S.B. Mall *et al.*, in *Taxon* 24:509. 1975)

Specimens examined: Himachal Pradesh: Janila hills, 1300m, 24.3.1957, *M.A.Rao* 2089 (BSD). Uttar Pradesh: Pithoragarh Dist: Naini Saini, 1560 m, 16.4.1992, *T. Husain* 212336 (LWG); Naini Saini, Bhangali Bunga Jungle, 1950m, 18.4.1992, *T. Husain* 212337 (LWG); On way to Kenalichina, Dhawaj, 1950m, 19.4.1992, *T. Husain* 212339, 212340 (LWG); On way to Kenalichina 1800m, 19.4.1992, *T.Husain* 212341, 212342 (LWG); Chandak, 1950m, 20 4.1992, *T.Husain* 212346, 212347 (LWG); On way from Tejam to Sungdum, 1980m, 24.4.1992, *T.Husain* 212361 (LWG); Tejam, 1980 m, 24.4.1992, *T. Husain* 212362 (LWG); Sobla, 1980m, 25.4.1992, *T.Husain* 212364 (LWG); On way from Sobla to Narayan Ashram, 2100m, 26.4.1992, *T. Husain* 212365 (LWG); Narayan Ashram, 2100 m, 27.4.1992, *T.Husain* 212366 (LWG); Bhatkot, 1680m, 4.5.1992, *T. Husain* 212369, 212370, 212371, 212372, 212372 (LWG); Mushtmanu, 1950m, 5.5.1992, *T. Husain* 212374, 212375, 212376 (LWG); Suvakot, near Wadda, 1650m, 6.5.1992, *T.Husain* 212377, 212378, 212379, 212380, 212381, 212382 (LWG); Almora Dist.: Ranikhet Chaubatia, 17.3.1961, *M.A.Rao*. 2.10.1912, *D.Hooker* 39034 (Sikkim) Jageshwar, 1980m, 7.5.1992, *T.Husain* 212384 (LWG); Nainital Dist, Jeolikot, 1250m, *T.Husain* & *B.Datt* 211443 (LWG); Naukuchia Tal, 16.3.1961, *s.l.* 14199 (BSD); Dehra Dun, 900m, 12.3.1957, *Y.K.Sarin* & *T.A.Rao* 1928 (BSD); Sahastradhara, 29.1.1964, *S.K .Malhotra* 30793, 31218 (BSD); Mussoorie, Barlowganj, 1500m, 27.12.1956, *Y.K.Sarin* 1485 (BSD); Pauri Garhwal: Lansdown, 1500m, 25.2.1960, *J.N.Vohra* 11199 (BSD); Nagdeoarea, 1800m, *R.P.Srivastava* 57012 (BSD); Khirsu 2100 m, 25.2.1980, *A.A.Ansari* & *Gharianad* 69081 (BSD); Tehri Garhwal: Rani chauni, 2000m, 28.2.1979, *A.K.Goel* 65801 (BSD); Garhwal; N Range tharali, 900-1800m, 22.3.1914, *Daulat Singh* 11 (BSD); Labha, 1650m, 23.3.1914, *A.E. Osmaston* 261 (BSD); Ameli Forest, 1800m, 6.4.1913, *A.E. Osmaston* 125 (BSD); Mussorie, 10.2.1900, *P.W. Makinnone* *s.n.* (SIKKIM). West Bengal: Darjeeling Bot. Gard., 8.3.1958, *Vaid* & *Thaphiyal* 25198 (DD). Arunachal Pradesh: Kameng F.D., 10.5.1957, *R. S. Rao* 7264 (SIKKIM); Kameng F.D., 5.4.1957, *G.Panigrahi* 6538 (SIKKIM). Kameng, Jabrang, *R.S.Rao* 6538, 7264 (ASSAM); Kameng, 1650 m, 16.4.1964, *K.C.Sahni* 5187 (DD). Bihar: Chotanagpur, 1884, *Schlich* 7231 (SIKKIM). Madhya Pradesh: Pachaurli - Hoshangabad, *s.l. s.n.* (BSD). E. Nepal: Khenji Bahadur Valley, *R.S. Rao* 17226 (ASSAM).

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Berberis asiatica var. **clarkeana** Schneid. in Bull. Herb. Boiss. Ser. 2,5:457. 1905; Ahrendt in J. Linn. Soc. Bot. 57:87. 1961; Uniyal & Rao in Sharma *et al.*, Fl. India 1:370. 1993.

Type: Bengal: *Clarke 3417 B* (holo - K).

Fl. & Fr.: April - Aug.

Distribution: INDIA: Arunachal Pradesh, Bihar, Madhya Pradesh, NEPAL; BHUTAN.

Ecology: Open hill sides; 1000-2000 m.

Notes: Although the authors could not examine any of the specimens of this variety, yet it seems from the description that these two varieties should not be kept separately.

31. Berberis hainesii Ahrendt in J.Bot.Lond. 80 (Suppl.): 105. 1944; et in J.Linn. Soc. Bot. 57: 90. 1961; Chatterjee in Rec. Bot. Surv. India 16(2): 14. 1953; Uniyal & Rao in Sharma *et al.*, Fl. India 1:371. 1993. (Fig. 16)

Shrubs 1.5-2 m tall; stems pale yellow, terete; internodes 1.5-6 cm long; spines 6-12 mm long, sulcate. Leaves 4-6x2-3 cm, broadly oblong-elliptic, apex mucronate, base truncate, thin, petioled, entire, rarely 1-4 spinulose; above dull grey green; below pruinose grey, papillose; young leaves thinner. Inflorescence umbellate-racemose or subfascicled, 3-6-fld. Flowers 8-10 mm across. Petals 6 mm long, narrowly obovate. Berries oblong-ellipsoid, estylose or shortly stylose, pruinose.

Notes: According to Ahrendt (1961) "this species is interesting in its unusual habitat, and its character, it has some affinity with *Berberis* sect. *Tinctoriae*, subsect. *Umbellatae* but even more with Sect. *Heteropodae*". Ahrendt (l.c.) has recognised two varieties under this:

Key to the varieties (after Ahrendt, 1961)

1. Pedicels 1-2 cm long; fruits estylose **B. hainesii** var. **hainesii**
1. Pedicels 6-9 mm long; fruits shortly stylose **B. hainesii** var. **brevifilipes**

Berberis hainesii var. **hainesii**

Type: India: Central Provinces, Pachinaki, June 1911, *Haines 2905* (holo - K).

Fl. & Fr.: June-Oct.

Distribution: INDIA: Madhya Pradesh (Endemic).

Ecology: On sandstones and rocks, ca 600-700 m.

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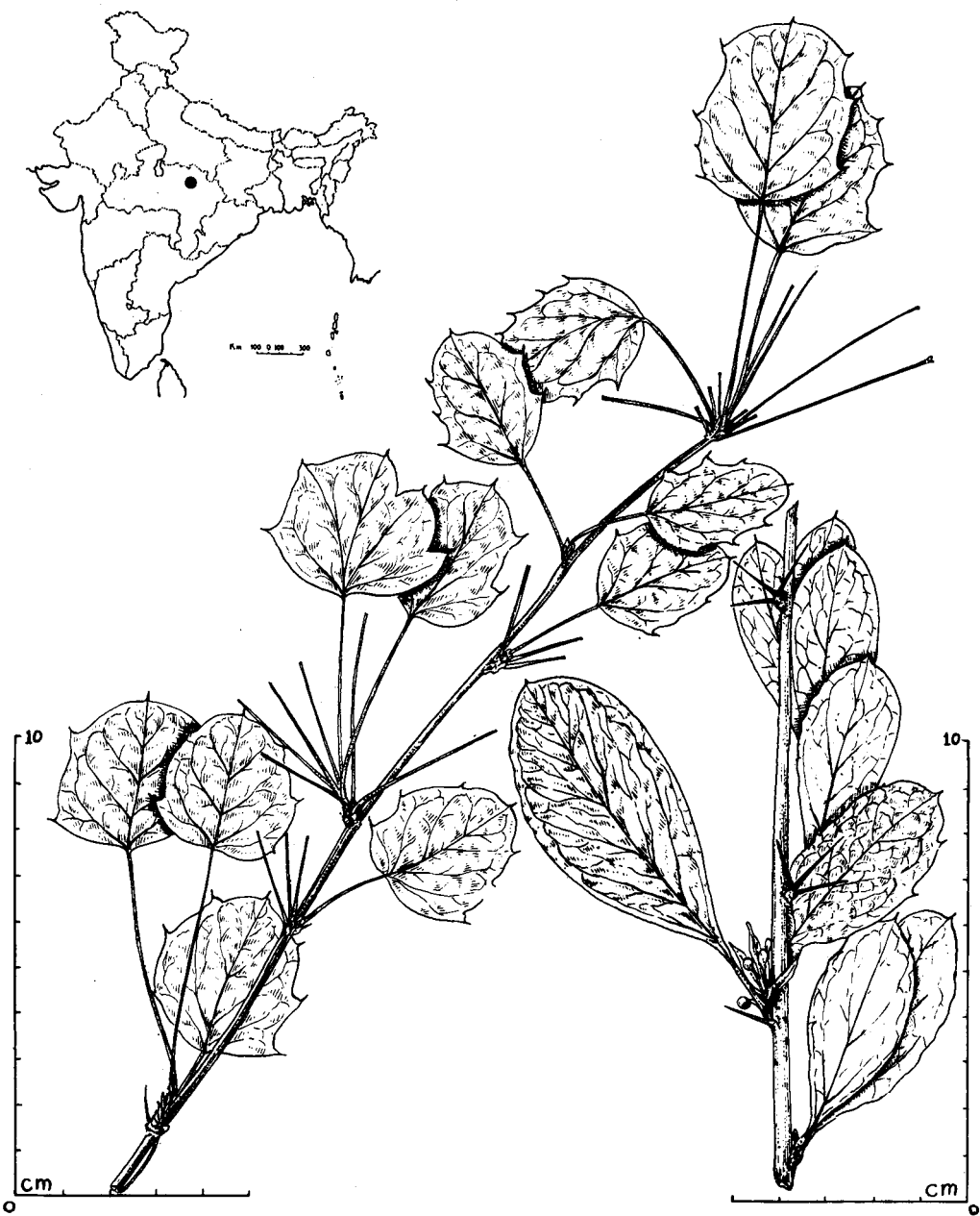


Fig. 16. *Berberis hainesii* Ahrendt (Based on R.S. Hole 864)

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Specimens examined: Madhya Pradesh: Jalgali (Pachmarhi), 16.12.1993, V. Nath & A.K. Asthana 205588 (LWG); Pachmarhi, 1908, R.S. Hole 864, 856 (DD).

Notes: The specimen collected by V. Nath and A.K. Asthana (No.205588) is in vegetative condition. Thus it was difficult to assign it to any variety.

Berberis hainesii var. **brevifilipes** Ahrendt in J.Bot.Lond.80 (Suppl.): 105. 1944; et in J. Linn. Soc. Bot. 57:91.1961; Chatterjee in Rec. Bot. Surv. India 16 (2): 15. 1953; Chatterjee in Rec. Bot. Surv. India 16 (2): 15. 1953; Uniyal & Rao in Sharma *et al.*, Fl. India 1:372. 1993.

Type: India: Central Provinces, near Bes falls; 18 Feb., 1891, Duthie 13202 (holo - K).

Fl. & Fr.: Feb. - June.

Distribution: INDIA: Madhya Pradesh (Endemic).

Notes: The authors could not examine any specimen of this taxon.

32. Berberis glaucocarpa Stapf in Bot. Mag. 101, sub. t. 9102. 1926; Ahrendt in J. Bot. Lond. 80 (Suppl.): 101. 1943; et in J. Linn. Soc. Bot. 57: 90 f. 26 1961; Chatterjee in Rec. Bot. Surv. India 16 (2): 14. 1953; Jafri in Nasir & Ali, Fl. W. Pak. 87:13 .f. 3, C. 1975; Uniyal & Rao in Sharma *et al.*, Fl. India 1: 371. 1993.

Berberis coriaria auct. non Royle; Brandis ex Gamble, Man. Indian Timb. ed. 1, 14.1881; Collett, Fl. Siml. 22. 1902.

Berberis aristata auct. non DC; Parker, For. Fl. Punj. with Hazara and Delhi 15. 1918.

Type: Jaunsar: hills between Tons and Gisi rivers, 8000 ft., May 1875, Brandis 746 (holo - K).

Shrubs 3-4 m tall; stems pale yellow, terete, glabrous, very minutely vemiculose; internodes 2.5-4 cm long; spines solitary or 3-fid, 5-16 mm long. Leaves 1.5 - 8 x 0.7 - 2.5 cm, obovate - elliptic, apex mucronate, base tapering, sessile or very shortly petioled, usually 4-8 spinose - dentate at margin, pale, venation clear on both surfaces. Inflorescence racemose, 15-25 - fld, 2-4 cm long, rigid, rarely slightly compound. Flowers 10-12 mm across, pale yellow; pedicels 5-10 mm long in fruit, stout. Prophylls ca 1 mm long. Outer sepals ca 2 mm long, ovate; middle ones 4 mm long; inner sepals 6 mm long, obovate. Petals 7 x 4.5 mm, obovate, apex retuse, base clawed; glands 2. Stamens 5.5 mm long, apices subapiculate. Berries 6-9 x 6-8 mm, oblong - globose, black, pruinose-white; style 1 mm long; seeds 3-4.

Fl. & Fr.: April - Sept.

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Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh; PAKISTAN; NEPAL.

Ecology: In open shrubby places; 2100-3000 m.

Specimens examined: Himachal Pradesh: Pangi village, Kinnaur Dt., 2900 m, 3.9.1963, N.C.Nair 30433 (BSD); Chimu 2775m, N.C.Nair 22295 (BSD); Sibola, 11.7.1877, J.S. Gamble 4583 (CAL); Simla, 2400, 30.9.1876, Gamble 1484 C (CAL). Uttar Pradesh: Garhwal: Tehri Garhwal: Manumangauga valley, 2000 m, 28.4.1968, C.M. Arora 37860 (BSD); Nagtibba, 2600 m, 27.7.1964, U.C. Bhattacharya 33743 (BSD); Gangi, 3000 m, 11.8.1978, A. K. Goel 64382 (BSD); Jaunsar, Mundali, 2100-2400m, 4.6.1894, Duthie 21090 (DD); Tehri, 2400 m, May, 1891, J.S. Gamble 22772 (DD); Jaunsar: B. Odyar, 2100m, May, 1892, Gamble 93892 (DD); Deoban, 2400 m, s.l. 23802 (DD); Mundali, 22.9.1958, K.C. Sahni 26743 (DD); T. Garhwal Deola, 2550 m, May, 1896, Gamble 25762 (DD); Jaunsar, Mundali, 2340 m, April; 1894, J.F. Duthie s.n. (CAL); Tehri Garhwal, Deota, 25550 m, Gamble s.n. (CAL); Uttarkashi, Sullhi slopes, 14.9.1991, B.S.Aswal 18318 (LWG); Uttarkashi Jhale, 14.9.1991, B.S. Aswal 18321 (LWG); Gangi, A. K. Goel 64382 (LWG). Kumaon: Farkia - Dwali, 2500 - 3000 m, 25.9.1957, T.A. Rao 4608 (BSD).

Notes: Ahrendt (1961) distinguished *Berberis glaucocarpa* from *B. aristata* mainly on the basis of their distribution as he has clearly remarked that "I have seen no herbarium specimens from east Tehri and the references to Kumaon (Collett, 1902) and Nepal (Parker, 1918) may introduce confusion with *B. coriaria* and *B. aristata*". Ahrendt (l.c.) and subsequently Uniyal and Rao (1993) have distinguished *Berberis* section *Tinctoriae* from section *Asiaticae* on the basis of colour of fruit whereas in the description of *B. aristata* they have mentioned berries as pruinose blue.

We have also studied specimens from Kumaon and Himachal Pradesh and the segregation of *B. glaucocarpa* from *B. aristata* and *B. coriaria* is difficult and a clear cut picture would only emerge after the study of type specimens of all the 3 taxa. The stout nature of the pedicel and the rigid inflorescence in *B. glaucocarpa* may be a good character for distinguishing this species from the other two above mentioned species.

33. ***Berberis lycium*** Royle in Trans. Linn. Soc. Lond. 17:94.1834; Hook.f.&Thoms.in Hook.f., Fl. Brit. India 1: 110. 1872 (partly); Hook.f. in Bot. Mag. 115: t.7075. 1889; Collett, Fl. Siml. 22. 1902; Chatterjee in Rec. Bot. Surv. India 16(2): 13. 1953; Parker, For. Fl. Punj. rep. ed.: 14. 1958 (partly); Ahrendt in J. Linn. Soc. Bot. 57:87. 1961; Jafri in Nasir & Ali, Fl. W. Pak. 87: 10. 1975; Uniyal & Rao in Sharma et al., Fl. India 1: 372-373. 1993.

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B. khasiana Ahrendt in J. Bot. Lond. 80 (Suppl.) 100. 1943; et in J. Linn. Soc. Bot. 57:89. 1961; Uniyal & Rao in Sharma *et al.*, Fl. India 1: 372. 1993. Type: Khasia Hills, 1844, Griffith *s.n.* (lecto - BM; isolecto - K.)

Shrubs upto 4 m high; stems terete or sulcate, ash grey, pale, glabrous or pubescent; internodes 1.5-3.5 cm long; spines 3-fid, 5-20 mm long, subterete. Leaves 2-7 x 0.5-1.2 cm, obovate or oblanceolate, attenuate at base, acute-mucronate at apex, entire or 2-4 spinulose along margins, papillose, greyish or whitish below. Inflorescence racemose, 10-25-fl'd., 3-6 cm long, rarely shorter and subfascicled. Flowers 6-8 mm across, usually pale-yellow; pedicels upto 2 cm long, slender, thin, glabrous; bracts 2-2.5 mm long. Prophylls 1 mm long, ovate. Sepals in 3 whorls; outer ones 2 x 1 mm, ovate, obtuse; median ones 3.5-3.75 x 2-2.5 mm, ovate, obtuse; inner ones 4.5-5 x 3 mm, obovate. Petals 4 x 2-2.5 mm, obovate, emarginate, with lanceolate basal glands. Stamens 2.5-3.25 mm, apiculate; anthers 1.25 mm long; filaments 1.25-1.5 mm long. Ovules usually 4, shortly stipitate. Berries 7-9 x 5 mm, ovoid to ellipsoid, blue or black with heavy grey white bloom, stylose; style 1 mm long.

Notes: Chiefly employed in making Rasout. Jafri *et al.* (l.c.) has remarked "a very variable species said to have replaced *Berberis ceratophylla* G.Don in Kashmir and Western Himalaya and itself to be replaced by *B. parkeriana* Schneid. in the bordering areas of Kashmir and Pakistan".

In one of our unpublished paper the authors have found the distinguishing characters of *B. lycium* and *B. khasiana* not only overlap but also vary from population to population and often on the same plant. Thus after the types of both the species at K and BM the authors have concluded that both these species are conspecific and therefore the species *B. khasiana* is merged under *B. lycium*.

Key to the varieties

- 1. Stems sulcate.
 - 2. Leaves whitish below **B. lycium** var. **lycium**
 - 2. Leaves dull green below **B. lycium** var. **subvirescens**
- 1. Stems terete.
 - 3. Inflorescence subfascicled **B. lycium** var. **subfascicularis**
 - 3. Inflorescence racemose **B. lycium** var. **simlensis**

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B. khasiana Ahrendt in J. Bot. Lond. 80 (Suppl.) 100. 1943; et in J. Linn. Soc. Bot. 57:89. 1961; Uniyal & Rao in Sharma *et al.*, Fl. India 1: 372. 1993. Type: Khasia Hills, 1844, Griffith *s.n.* (lecto - BM; isolecto - K.)

Shrubs upto 4 m high; stems terete or sulcate, ash grey, pale, glabrous or pubescent; internodes 1.5-3.5 cm long; spines 3-fid, 5-20 mm long, subterete. Leaves 2-7 x 0.5-1.2 cm, obovate or oblanceolate, attenuate at base, acute-mucronate at apex, entire or 2-4 spinulose along margins, papillose, greyish or whitish below. Inflorescence racemose, 10-25-fld., 3-6 cm long, rarely shorter and subfascicled. Flowers 6-8 mm across, usually pale-yellow; pedicels upto 2 cm long, slender, thin, glabrous; bracts 2-2.5 mm long. Prophylls 1 mm long, ovate. Sepals in 3 whorls; outer ones 2 x 1 mm, ovate, obtuse; median ones 3.5-3.75 x 2-2.5 mm, ovate, obtuse; inner ones 4.5-5x3 mm, obovate. Petals 4 x 2-2.5 mm, obovate, emarginate, with lanceolate basal glands. Stamens 2.5-3.25 mm, apiculate; anthers 1.25 mm long; filaments 1.25-1.5 mm long. Ovules usually 4, shortly stipitate. Berries 7-9 x 5 mm, ovoid to ellipsoid, blue or black with heavy grey white bloom, stylose; style 1 mm long.

Notes: Chiefly employed in making Rasout. Jafri *et al.* (l.c.) has remarked "a very variable species said to have replaced *Berberis ceratophylla* G.Don in Kashmir and Western Himalaya and itself to be replaced by *B. parkeriana* Schneid. in the bordering areas of Kashmir and Pakistan".

In one of our unpublished paper the authors have found the distinguishing characters of *B. lycium* and *B. khasiana* not only overlap but also vary from population to population and often on the same plant. Thus after the types of both the species at K and BM the authors have concluded that both these species are conspecific and therefore the species *B. khasiana* is merged under *B. lycium*.

Key to the varieties

- 1. Stems sulcate.
 - 2. Leaves whitish below **B. lycium** var. **lycium**
 - 2. Leaves dull green below **B. lycium** var. **subvirescens**
- 1. Stems terete.
 - 3. Inflorescence subfascicled **B. lycium** var. **subfascicularis**
 - 3. Inflorescence racemose **B. lycium** var. **simlensis**

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Berberis lycium var. **lycium**

Type: Kashmir: *Royle s.n.* (K, LIV, not seen).

Fl. & Fr.: March-Sept.

Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Madhya Pradesh, Tamil Nadu; PAKISTAN; NEPAL.

Ecology: Open hill sides; 600 m- 2700 m.

Chromosome No.: $n = 14$ (Singhal et al., in *Taxon* 29: 355. 1980).

Specimens examined: Jammu & Kashmir: Loran-sultanpathee, 2000-2500m, 17.9.1985, *Vohra & Naithani 74348* (BSD); Ramnagar, Udhampur, 23.3.1986, *Ajaiswami 540* (BSD); Bhaderwah, 2000 m, 29.5.1959, *T.A.Rao 9071* (BSD); Patani Top, 2300-2500 m, 11.9.1958, *T.A.Rao 7486* (BSD); Gulmarg, 29.6.1956, *T.A.Rao 187* (BSD); Srinagar, 1680m, 8.5.1892, *J.F. Duthie 10835* (DD); Jhelan valley, 1680m, 3.5.1892, *J.F. Duthie 10907* (DD); Tangmarg, 2100 m, 5.6.1968, *H.D. Thaphiyal 26436* (DD); Srinagar, 6.7.1891, *G.A. Gammie s.n.* (CAL); June 1905, *Meebold 3976* (CAL); Jammu Pr., Kishtwar, Doda, 17.7.1956, *G. Saran & Party 30055* (LWG); Baramulla, 30.6.1955, *Kaul & Party 23588* (LWG); Kud, 1500m, 12.5.1954, *Ram Lakhan 9818* (LWG); Sankaracharya Rocks, 19.5.1954, *L.D. Deo 10366* (LWG). Himachal Pradesh: Rainuka Lake, 14.4.1960, *M.A. Rau 11398* (BSD); Kalka, 31.3.1961, *M.A. Rau 14556* (BSD); Manali, 1800 m, 15.7.1972, *U.C.Bhattacharya 48537* (BSD); Dalhousie, 13.7.1963, *C.L. Malhotra & V.J.Nair 27351* (BSD); Lahul, Naggar, 24.7.1938, *N.L. Bor s.n.* (DD); Kullu valley, 8.6.1950, *S.K.Jain & R.C. Bhardwaja s.n.* (DD); Kullu, Parbathi valley, 23.5.1934, *C.E.Parkinson 3919* (DD); Kangra, 7.8.1928, *Bis Ram 319* (DD); Nagkanda, 2100 m, Jun. 1878, *J.S. Gamble 6128A* (DD); Manali, 15.7.1972, *U.C. Bhattacharya 48537* (SIKKIM); Chamba Dist., *B.M.Wadhwa 51076* (LWG, DD); Kathli local, 7.6.1959, *J.G. Srivastava & Party 61059* (LWG); from Aut to Panjia, 19.5.1959, *J.G. Srivastava & Party 58548* (LWG); Vashisht Kund, beyond Mand, Kangra Kullu Valley, 27.5.1959, *J.G.Srivastava & Party 60330* (LWG); Dalhousie, 3.6.1959, *J.G. Srivastava & Party 60667* (LWG); Bharatpur Road, Simla, 4.6.1954, *Ram Singh 12860* (LWG); On way to Taradevi hill, Mandi, 15.5.1959, *J.G. Srivastava & Party 59880* (LWG). Uttar Pradesh: Garhwal: Dehra Dun: Sahashradhara, 24.5.1963, *S.K. Malhotra 27672* (BSD); Robers cave, 24.4.1964, *C.R.Babu 35232* (BSD); Raipur, 1000 m, *U.C. Bhattacharyya 14816* (BSD); Chakrata, 2600 m, 18.4.1957, *M.A. Rau 2225* (BSD); Chakrata, 20.7.1968, *O.P. Misra 38105* (BSD); Agastmani, 21.4.1963, *C.L. Malhotra 26834* (BSD); Nandprayag, 23.6.1959, *M.A. Rau 10398* (BSD); Mandal Area, 1650 m, 21.5.1971, *B.D. Naithani 43941* (BSD); Pauri - Garhwal: Khirsu, 1700 m, 17.4.1977, *A.S. Rao 56469* (BSD); Khirsu Garden, 1800m, 4.5.1976, *R.P. Srivastava*

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57033 (BSD); Nagdev Area, 1800 m, 22.4.1976, *R.P. Srivastava* 57012 (BSD); Mussoorie: 1600m, 2.4.1966, *C.L. Malhotra* 36803 (BSD); Mall Road, 1950m, 19.12.1956, *T.A. Rao* 1331 (BSD); Tehri, Suki to Thala, 2400-2700 m, *J.F. Duthie* 599 (DD); Jaunsar, Kotikansor, 1800 m, 1.6.1936, *C.E. Parkinson* 7041 (DD); Chakrata, 2190m, 27.5.1953, *M.B. Raizada* 23614 (DD); Uttarkashi, 1020m, 24.5.1956, *K.C. Sahni* 24774 (DD); Saharsdhara, 600 m, 30.6.1960, *R.K. Issar* s.n. (DD); Uttarkashi Dist.: Near NIM, 1.6.1992, *B. Datt & B. Lal* 212235 (LWG); Gangori, 1200 m, 30.5.1992, *B. Datt & B. Lal* 212233 (LWG); Kalyani, 1550m, 30.5.1992, *B. Datt & B. Lal* 212231, 212226, 212227 (LWG); Barkot, 1200m, 6.6.1992, *B. Datt & B. Lal* 212273 (LWG); Dehra Dun: Bhudrawala, 17.8.1962, *J.N. Vohra* 379 (SIKKIM); Mussoorie, 1869, *G. King* s.n. (SIKKIM). Madhya Pradesh: Panchmarhi, 1200m, Aug., 1949, *R.C. Bharadwaja* s.n. (DD).

Berberis lycium* var. *subfascicularis Ahrendt in J. Linn. Soc. Bot. 57:88. 1961; Uniyal & Rao in Sharma et al., Fl. India 1:374. 1993.

Type: Kashmir, Kistwar Dist., Tsingana, 6500ft, *Ludlow & Sherriff* 9105 (holo - BM).

Fl. & Fr.: April - July.

Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh.

Ecology: 1550 m - 2200 m.; Common in drier exposed places and in forest clearings.

Chromosome No.: $n = 14$ (V.K. Singhal et. al., in Taxon 29: 355. 1980).

Specimens examined: Jammu & Kashmir: Kashmir, Qazigurd, 1650m, 15.5.1954, *G.S. Srivastava* 10244 (LWG). Uttar Pradesh: Garhwal: Uttarkashi Dist., Bhankoli village, 2000m, 30.5.1992, *B. Datt & B. Lal* 212229, 212228 (LWG); Uttarkashi Dist., Kalyani, 1550m, 30.5.1992, *B. Datt & B. Lal* 212230 (LWG).

Berberis lycium* var. *simlensis Ahrendt in J. Asiat. Soc. Beng. (Sci.) 11.1.1945; et in J. Linn. Soc. Bot. 57:88.1961; Uniyal & Rao in Sharma et al., Fl. India 1:373. 1993.

Type: Punjab Himalaya: Simla, 7000 ft., July 1885, *Collett* 234 (holo - K).

Fl. & Fr.: March - July.

Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh.

Ecology: 1200m - 2100m, in exposed drier place.

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Specimens examined: Jammu & Kashmir: Khajpura, 2100m, 24.10.1953, *Kaul & Party s.n.* (LWG). Himachal Pradesh: Dalhousie, 1800m, 18.5.1971, *K.K. Singh & Party 3417* (LWG); Nagar, Kullu valley, 25.5.1959, *J.G. Srivastava & Party 60315* (LWG). Uttar Pradesh: Garhwal: Uttarkashi Dist.: Barkot, 1200 m, 6.6.1992, *B. Datt & B. Lal 212274* (LWG); Kalyani, 1550 m, 30.5.1992, *B. Datt & B. Lal 212225* (LWG); Kuthnor vill., 9.6.1992, *B. Datt & B. Lal 210588* (LWG).

Notes: Uniyal and Rao (1993) have mentioned that "this variety may be distinguished from all the other varieties of the group mainly by the pubescent nature of the stem", but this is not true as all the other varieties of *Berberis lycium* also have pubescent stems either while young or mature, a view also expressed by Uniyal and Rao (l.c.).

Berberis lycium* var. *subvirescens Ahrendt in J. Linn. Soc. Bot. 57: 88. 1961; Uniyal & Rao in Sharma et al., Fl. India 1:374. 1993.

Type: Kashmir: Gandarbal, Sind valley, 5200 ft., 31 May, 1940, *Ludlow & Sherriff 8095* (holo - BM)

Fl. & Fr.: April - June

Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh.

Ecology: 1500 - 1700m, common in village area on banks of streams.

Specimens examined: Jammu & Kashmir Baramulla, 30.6.1955, *Kaul & Party 23588* (LWG). Himachal Pradesh: Chamba, 1500m, 30.4.1972, *K.K.Singh & Party 2746* (LWG). Uttar Pradesh: Garhwal: Uttarkashi Dist., Kuthor vill., 9.6.1992, *B. Datt & B. Lal 210588* (LWG); Kalyani, 1550m, 30.5.1992, *B. Datt & B. Lal 212232* (LWG).

Notes: Ahrendt (l.c.) and subsequently Uniyal and Rao (l.c.) stated that this variety is endemic to Jammu and Kashmir but our collections and present study show that this variety is also common in U.P. Himalaya especially Uttarkashi Dist. of Garhwal and also Himachal Pradesh.

34. *Berberis ahrendtii* R.R.Rao & Uniyal in Indian J. For. 8(4): 334. 1985; Uniyal & Rao in Sharma et al., Fl. India 1: 369. 1993.

B. lycioides Stapf in Bot. Mag. 151, t. 1902. 1926; Ahrendt in J. Linn. Soc. Bot. 57: 89. 1961, non Lowe, 1856, nec Linden & Planch, 1863.

Type: Cultivated: Fl. June, 1939; Fr. 27 Sept. 1939 (type - BM).

Shrubs, up to 3.5 m tal; stems pale yellow, glabrous, terete; internodes 3-5 cm long;

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spines, 1-2 cm long, solitary. Leaves 1.5-7 x 0.5-1.8 cm, narrowly obovate, apex subacute or mucronate, base attenuate, sessile, entire or slightly spinulose, finely reticulate, epapillose. Inflorescence racemose, 10-20-fld, dense, drooping, sometimes compound below; peduncles 1-2 cm long; flowers 12-14 mm across; pedicels 7-10 mm long; bracts 2-3 mm. Sepals in 3 whorls; outer sepals 2.5 x 1.5 mm, ovate, acute; median ones 5x2.5 mm; inner ones ca 7.5-8 x 4.5-5 mm. Petals 6-5 x 4 mm, obovate-elliptic, entire, shorter than the inner sepals; marginal glands 6.5 x 4 mm. Stamens 5 mm long produced, apiculate. Berries 11 x 6 mm, oblong-ovoid, pruinose, grey-white; style 1-1.25 mm long.

Fl. & Fr.: April - Oct.

Distribution: INDIA: Uttar Pradesh (Endemic).

Ecology: not known.

Specimens examined: Uttar Pradesh: Chamoli, Sept. 1864, Brandis 3275 (CAL).

Notes: Rao and Uniyal (1985) proposed a new name for *Berberis lycioides* Stapf. as this name is a later homonym of *B. lycioides* Linden & Planch, 1863.

35. *Berberis parkeriana* Schneid. in Fedde Report. Sp. Nov. 11:162. 1912; Ahrendt in J.Bot. Lond. 80 (Suppl.): 105. 1944; et in J. Linn. Soc. Bot. 57:89. 1961; Chatterjee in Rec. Bot. Surv. India 16 (2): 14. 1953; Jafri in Nasir & Ali, Fl. W. Pak. 87:11 f. 2, G-J. 1975; Uniyal & Rao in Sharma et al., Fl. India 1:374. 1993. (Fig. 17)

Type: Pakistan: Hazara, Bagnolar Reserve, 1910, flower, *Parker s.n.* (syn. - W,K); Abbottabad, 1910, fruits, *Parker s.n.* (syn. - W).

Shrubs, upto 2.5 m high; stems sulcate; shoots puberulous; internodes 1.5-3 cm long; spines 1-2.1 cm long, 3-fid, slender, sulcate. Leaves 2-6 x 0.5-1.3 cm, narrowly obovate or lanceolate to oblanceolate, apex mucronate, base attenuate, entire, epapillose, petioles very short, concolorous green. Inflorescence subfascicled, racemose, 4-18-fld; pedicels 8-14 mm long, lower flowers with longer pedicels; prophylls 1x0.5 mm. Outer sepals 2.5x1.5 mm, oblong-elliptic, reddish; inner sepals 5x4 mm, obovate-elliptic. Petals 4.5-5x2-3 mm, narrowly oblong-elliptic, cuneate, subentire, glands 0.8x0.2 mm. Stamens 4 mm long, Shortly apiculate. Ovules 4. Berries 8-9 x 5-7 mm, broadly obovoid to suborbicular; bright blue, pruinose, stylose; style 1 mm long.

Fl. & Fr.: April - July.

Distribution: INDIA: Jammu & Kashmir, Himachal Pradesh; PAKISTAN; IRAN.

Ecology: 1000 - 2000 m.

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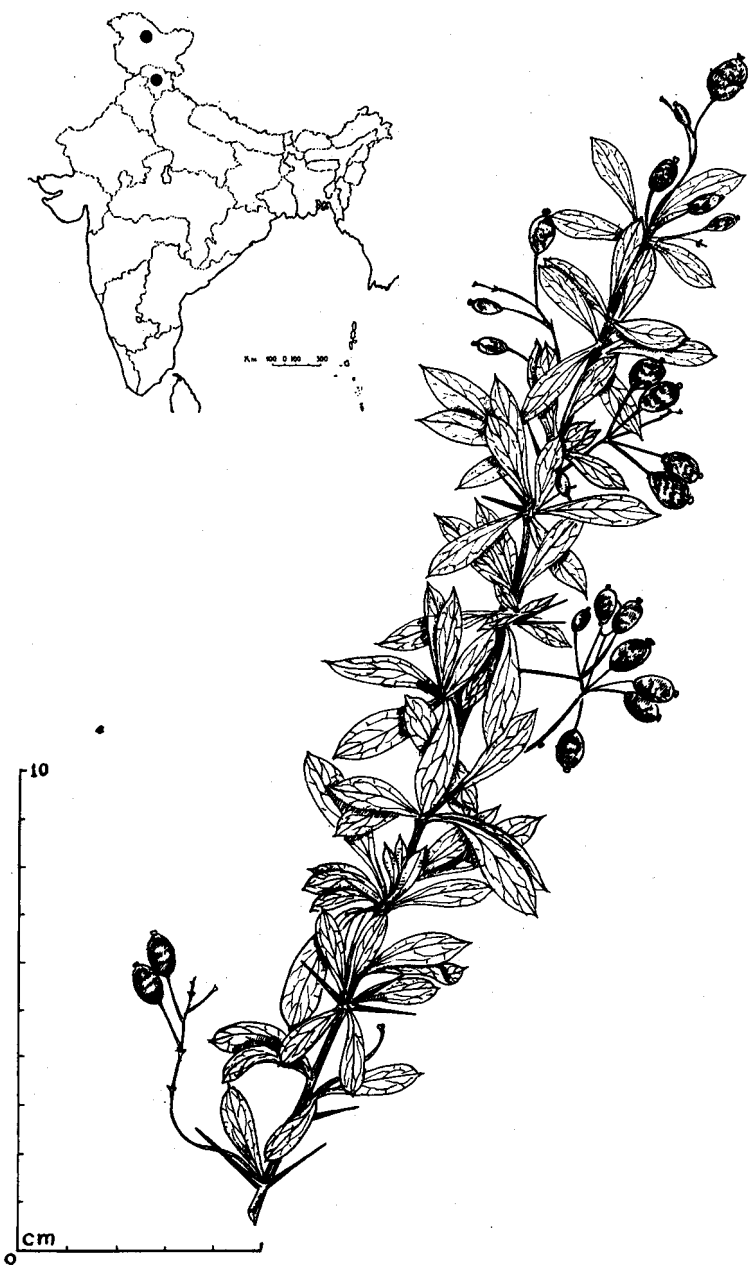


Fig. 17. *Berberis parkeriana* Schneid. (Based on U.C. Bhattacharyya 44890)

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Specimens examined: Himachal Pradesh: Manali, 2000 m, 31.7.1917, U.C. Bhattacharyya 44890 (LWG, BSD).

Notes: Ahrendt (1961) had mentioned Parker 4435 as the Type of this species but Jafri *et al.* (1975) had cited two specimens of Parker without number deposited at W and K as syntypes but as we could not examine the Types mentioned by the above authors it is difficult to say on which specimen Schneider had actually based his description of this species. Till such time when it is contradicted Jafri's (l.c.) typification is followed. Further according to Jafri *et al.* (l.c.) this species is very close to *Berberis lycium*.

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